

SB  
193  
3  
A352  
A4



~~Analysis~~ of performance of herbaceous  
and woody forage species in Central and West Africa

AFRNET, 4th Annual Meeting Bamako, Mali  
March 29 - April 2, 1993

CIAT  
BIBLIOTECA

Maria Cristina Amezcua <sup>1\</sup>  
Carlos Lascano <sup>2\</sup>  
Gerardo Ramirez <sup>2\</sup>  
Luis H. Franco <sup>2\</sup>

14859  
F 9 MAR. 1994

<sup>1\</sup> Biometry Unit and <sup>2\</sup> Forages Program, CIAT, Cali, Colombia  
Correspondence Apartado Aereo #67-13, Cali, Colombia

## Content

	Page
1 <b>Introduction</b>	1
2 <b>Data source</b>	2
3 <b>Statistical analysis methodology</b>	2
3 1 Definition of establishment and biomass production indicators	2
3 2 Analysis per location	3
3 3 Across location analysis	3
4 <b>Results</b>	4
5 <b>Conclusions</b>	5

Annex Results of statistical analysis for individual locations Kurmin Bire (Nigeria), Kovie (Togo), Avetonou (Togo), Bouaké (Ivory Coast)

## Acknowledgements

To researchers from AFRNET member Institutions, whose data was considered for this study

Mrs Shirley Tarawali, ILCA (International Livestock Centre for Africa), Kurmin Biri, Nigeria

Mr K Agbemelo-Tsomato, E S A (Ecole Superieure d'Agronomie Universite du Benin), Kovie, Togo

Mr Atisso Delfy, CREAT (INZV), Avetonou, Togo

Mr C Bodgi N'Guessan, CRZ-IDESSA (Institut des Savanes), Bouake, Ivory Coast

# Analysis of performance of herbaceous and woody forage species in Central and West Africa

## 1 Introduction

The AFRNET (African Network project) was created in 1988 as a collaborative research effort between IEMVT of CIRAD<sup>1</sup>, ILCA<sup>2</sup> and CIAT<sup>3</sup> to conduct adaptive research on forage species for cattle feeding in the humid and sub-humid areas of West and Central Africa. National agricultural research institutions from 11 countries were invited to participate and 15 trials were initially established in these countries with seed received from CIAT (table 0). IEMVT finances the project and is responsible for its overall coordination, CIAT provides forage germplasm, provides definition of experimental design/implementation, scientific monitoring of the trials and is also responsible for the management and statistical analysis of the information generated by AFRNET, ILCA provides scientific guidance. The "project identification meeting" took place in Togo in November 1989, the first annual workshop took place in Togo, in April 1990, to clearly identify experimental sites, the second annual workshop was conducted in April 1991 "to balance and reactivate the project". The third annual workshop took place in Bouake, Ivory Coast in March 1992 in which partial results were presented (de Fabregues, 1991). This 4th annual meeting will revise results attained during the 2-year period April 1991 - March 1993.

As part of CIAT's contribution to AFRNET's 4th annual meeting, our paper presents a methodology for the statistical analysis of information generated by the Network. The methodology for analyzing a single location was presented by CIAT during last year's meeting (Amezquita and Lascano, 1992) using data generated by Kurnin Bire, Nigeria, the most complete trial. This year, a methodology for a combined across locations analysis will be presented, using information from those experimental sites which have reported information on establishment as well as on production periods.

---

<sup>1</sup> IEMVT = Institute de l'Evage et Medicine Veterinaire  
Tropicale, France. IEMVT is one of the research Centers  
of CIRAD (Centre Internationale pour la Recherche  
Agricole et Development), for France and its ex-colonial  
territories.

<sup>2</sup> ILCA = International Livestock Centre for Africa,  
Addis Ababa, Ethiopia.

<sup>3</sup> CIAT = International Center for Tropical Agriculture,  
Cali, Colombia.

## 2 Data Source

7 sites, out of the initial 15, have reported information to CIAT at present (table 1). However, only 4 of them have reported information on all experimental periods: establishment, biomass production during maximum rainfall and biomass production during minimum rainfall. They are Kurmin Bire (Nigeria), Bouake (Ivory Coast), Avetonou (Togo) and Kovie (Togo). Information generated by these four sites was used as data source for the present study. They represent humid or subhumid savanna environments, with a relatively long dry season. Ecotypes considered for the analysis include 8 grasses, 21 herbaceous legumes and 6 tree legumes (table 2). Out of them 8, 16 and 3 respectively were evaluated by the four experimental sites -and were therefore included in the across location analysis.

## 3 Statistical Analysis Methodology

- Three independent experiments were established at each experimental site: one for grasses, one for herbaceous legumes and one for tree legumes. The experimental design for each corresponds to a split-plot with 3 reps, with 'ecotype' as main plot and 'age at cutting' as sub-plot. The statistical analysis methodology here presented adheres to these facts. Therefore, independent analysis for grasses, herbaceous legumes and tree legumes are performed per location and across-locations.

### 3.1 Definition of establishment and production indicators

The following indicators were selected to best characterize performance of an ecotype:

#### For herbaceous grasses and legumes

- Establishment indicators
  - 1 % cover at 12 weeks
  - 2 Ratio of % cover at 4 weeks, indicating rapidity of establishment  
% cover at 12 weeks
- Production indicators
  - 3 Dry Matter (DM) at 12 weeks during maximum rainfall (kg/ha)
  - 4 DM-12 weeks during minimum rainfall (kg/ha)
  - 5 Dry-rainy season ratio in terms of DM-12 weeks

#### For tree legumes

- Establishment indicators
  - 1 Plant height at 12 weeks (cm)
  - 2 Ratio of plant height at 4 weeks  
plant height at 12 weeks

Production indicators

- 3,4,5 as for herbaceous species above
- 6 Plant height at 12 weeks during maximum rainfall (cm)
- 7 Plant height at 12 weeks during minimum rainfall (cm)
- 8 Dry-rainy season ratio in terms of plant height at 12 weeks

### 3.2 Statistical analysis per location

Statistical analysis per location were performed for each one of the four locations reporting complete information -Kurmin Bire, Kovie, Avetonou and Bouake. Results are incorporated as an annex to this paper. Given that no significant correlation was detected between establishment indicators and biomass production indicators at each individual location, each indicator was analyzed independently through standard analysis of variance. Given the importance of detecting ecotypes with good performance during the dry season, ecotypes were organized according to their DM production at 12 weeks during minimum rainfall. Dry-rainy season ratio in DM as well as in plant height are also very useful. However, all indicators need to be considered for selecting the best ecotypes for a given site.

Two sites, Kovie and Bouake, reported information on DM production during maximum rainfall for the second year of evaluation. Results of the statistical analysis per site (see Annex) show general consistency in gross performance (see tables 2.1 vs 2.4 and 3.1 vs 3.4). However, for herbaceous legumes certain legumes shown promising during the first year, did not perform as well during the second year. This is the case of *A. lustrix* 9690 or *Z. latifolia* 728 in Kovie (tables 2.2 vs 2.5) or *S. hamata* 147 in Bouake (tables 3.2 vs 3.5). These results indicate that precautions should be taken when generalizing results based on a one-year evaluation period.

### 3.3 Statistical Analysis across locations

An independent analysis was performed for grasses, for herbaceous legumes and for tree legumes. 8 grasses, 16 herbaceous legumes and 3 tree legumes common to the 4 experimental sites, were considered for the across locations analysis. In this case, significant correlations were found between some indicators, suggesting therefore that a reduction in the number of response variables could be attained. For this purpose, a Principal Component Analysis on establishment and production indicators - previously standardized to 0 mean and variance of 1 - was performed. A reduced number of principal components explaining a high percentage of the total variance, was selected as the new set of response variables. As a principal component is a

linear combination of the original variables, and normally distributed, the selected principal components were interpreted and analyzed through analysis of variance, under the model shown below

Sources of variation	df		
	Grasses	Herbaceous legumes	Tree legumes
Location	3	2	2
Rep (Location)	8	6	6
Ecotype	7	15	2
Ecotype x location	21	30	4
Error	56	90	12
TOTAL	95	143	26

As the dataset presented unequal subclass numbers, the analysis of variance for each principal component was performed using the PROC GLM of SAS (version 6,07), using SS type III Least-square means, to adjust for missing values, were reported instead of arithmetic means. To facilitate a visual interpretation of ecotype performance, the ecotypes were placed in a two-dimensional graph, where axes corresponded to the first two resulting principal components

#### 4 Results

Tables 3 and 4 show overall performance indicators and means per location respectively

**Grasses** The first two principal components explained 78% of the total variance and were therefore selected as the new set of response variables. By observing their score, the first principal component, explaining 44%, can be interpreted as 'high dry matter production potential'. The second one, explaining 34%, can be interpreted as 'high dry-rainy season ratio, with low cover % during establishment' (table 5). Least-square means per ecotype for the first two principal components as well as for original indicators are presented in table 6. Significant differences between ecotypes were detected in both principal components (see LSD values, table 6). When the 8 grass ecotypes are classified in terms of both principal components, the best ecotypes--those with high DM production potential and high dry-rainy season ratio-- can be easily identified. They are (see figure 1) *B dictyonema* 6133, *B brizantha* 26646, *B decumbens* 606, and *P maximum* 673. Figures 3 to 6 show DM production performance during maximum and minimum rainfall periods, at each individual location, of an outstanding ecotype -*B brizantha* 26646 vs a non adapted ecotype -*P maximum* 16031-

**Herbaceous legumes** As in the case of grasses, the first two Principal Components explained a high percentage of the total variance-- 76% in this case--, and were therefore considered as the new set of response variables. The first principal component, explaining 46%, can be interpreted as "high dry rainy season ratio and high DM production during minimum rainfall", the second principal component explaining a 30% can be interpreted as 'high DM production during the maximum rainfall period' (table 7). Least-square means per ecotype for the first two principal components as well as for original establishment and production indicators are presented in table 8. LSD values show that significant differences between ecotypes were detected (table 8). When the 16 herbaceous legumes are placed in a two-dimensional graph using the two principal components as axis the best legume *S. guianensis* 10136, can be identified (figure 2). Figures 3 to 6 show DM production performance during maximum and minimum rainfall periods, at each individual location, of this outstanding legume vs a non-adapted ecotype -*C. rotundifolia* -2

**Tree legumes** Given that only three ecotypes were common to the four experimental sites and that high variability is reported per site for the various establishment and production indicators (see tables 1.3, 2.3, 3.3 and 4.3 in the annex), it was decided to postpone a combined across location analysis for three legumes when more information were available.

## 5 Conclusions and general comments

- 1 This is a methodological paper. Its emphasis is on the strategy for the statistical analysis of information generated by AFRNET rather than on the biological interpretation of results. Why a given ecotype was found superior is beyond the scope of this paper. A coherent and correct interpretation requires the participation of those researchers directly involved in the evaluation of germplasm and knowledgeable of environmental constraints of their experimental site.
- 2 Given that multiple establishment and production indicators are contemplated in this problem, some of them correlated, the use of the Principal Component Analysis as a reduction-of-dimensionality technique was found appropriate. It also facilitates a visual identification of promising ecotypes.
- 3 There is a need to have more complete records in order to make a better use of AFRNET information for the benefit of its members. A call is made to all collaborators in this respect.



## References

- 1 Amezquita, M C and Lascano, C, 1992 "RABAOC-Statistical Analysis per Location Case Kurmin Bire (Nigeria)" Presented at the 3rd annual meeting of RABAOC Bouaké, Ivory Coast, April 1992
- 2 de Fabregues B P, 1991 RABAOC Proyecto de investigacion sobre la alimentacion del ganado en Africa Occidental y Central (Reporte de actividades, CIAT, Diciembre 2, 1991)

**Table 0** Experimental trials initially established - AFRNET

COUNTRY	LOCATION	COLABORATOR
Camerun	N'kolbisson (Youndé) Minkoa (Bamenda) Babungo	J Kouonmemoc
Central African Republic	Bangui Bossemebele	Mathieu Berekoutou M Berekoutou
Ivory Coast	Bouaké Korhogo	C Bodji N guessin
Ghana	Achimota	Albert Addo-Kwafo
Nigeria	Kurmin Biri Shica Jos	Shirley Tarawali Emmanuel Agishi
Togo	Avetonou Kovie	Atisso Delfy K Agbemelo-Tsomafo
Senegal	Sareyorobana (Kolda)	D Lepironnec
Guinea		Diallo Mamoudou
Benin	Cotonou	Claude Abandedjan
Kenya		John Ndikumana
Burundi		

Table 1 List of experimental sites which have reported information up-to-date - AFRNET

Location			Ecosystem	Altitude (masl)	Precip mm/yr	No dry months	Accumulated Precipit. during dry period (mm)	Mean annual Temperature (°C)		Soil					
Code	Name	Country						Min	Max.	pH	OM (%)	P ppm	Sand %	Silt %	Clay %
RA 02	Kurmin Birn	Nigeria	Subhum savanna	700	1200	6	0			5.5	1.4	2.6			
RA 06	Sare-Yoro-bana Kolda	Senegal	Shrub savanna	40	1000	6	1	20.5	35.3	5.1	1.1		74	22	4
RA 01	Shica	Nigeria	Subhum Shrub savanna	600	1000	6	21								
RA 03*	Kovie	Togo	Semi-decid forest	20	800-1000	5	200	24.2	30.8	6.9	3.8	6.5	50	16	34
RA 05*	Bouake	Ivory Coast	Subhum shrub savanna	450	100-1200	5	201			6.0	1.3	38.1	70	14	16
RA 04*	Avetonou	Togo	Shrub savanna	150	1100-1300	5	224	16.5	26.0	6.3	1.5	40.9	68	14	18
RA 07	Bossemele	Central African Republic	Subhum shrub savanna	600	1500	4	126	19.0	31.5	5.0			62	35	3

\* Sites considered for data analysis in this study as they reported data during establishment and production periods

Table 2 Ecotypes evaluated at the 4 experimental sites

GRASSES (8)		HERBACEOUS LEGUMES (21)		TREE LEGUMES (6)	
CIAT No	NAME	CIAT No	NAME	CIAT No	NAME
621	<i>Andropogon gayanus</i> *	9690	<i>Aeschynomene histrix</i> *	18700	<i>Cajanus cajan</i> *
6780	<i>Brachiaria brizantha</i> *	17434	<i>Arachis pintoi</i> *	3001	<i>Codariocalix giroides</i>
26646	<i>Brachiaria brizantha</i> *	2	<i>Cassia rotundifolia</i> *	18516	<i>Cratylia argentea</i>
606	<i>Brachiaria decumbens</i> *	5277	<i>Centrosema acutifolium</i> *	33138	<i>Desmodium velutinum</i>
6133	<i>Brachiaria dictyoneura</i> *	5568	<i>Centrosema acutifolium</i> *	17403	<i>Flemingia macrophylla</i> *
6369	<i>Brachiaria humidicola</i> *	5234	<i>Centrosema brasilianum</i> *	17502	<i>Leucaenaleucocephala</i> *
673	<i>Panicum maximum</i>	5452	<i>Centrosema macrocarpum</i> *		
16031	<i>Panicum maximum</i>	5713	<i>Centrosema macrocarpum</i> *		
		-1	<i>Centrosema pascuorum</i>		
		5172	<i>Centrosema pubescens</i> *		
		13089	<i>Desmodium ovalifolium</i> *		
		13155	<i>Desmodium strigillosum</i> *		
		10280	<i>Stylosanthes capitata</i>		
		10136	<i>Stylosanthes guianensis</i> *		
		184	<i>Stylosanthes guianensis</i>		
		3	<i>Stylosanthes hamata</i> *		
		147	<i>Stylosanthes hamata</i> *		
		1281	<i>Stylosanthes macrocephala</i>		
		1044	<i>Stylosanthes sympodiales</i> *		
		8279	<i>Zornia glabra</i> *		
		728	<i>Zornia latifolia</i>		

\* Ecotypes considered in the combined analysis across locations

**Table 3 Results of combined analysis across locations  
OVERALL PERFORMANCE INDICATORS**

Indicator	Mean	Min	Max	SD <sup>11</sup>	CV <sup>11</sup>
<b>GRASSES</b>					
1 % of cover 12 weeks after establishment (%)	69	3	100	19	27.2
2 DM 12 weeks during min rainfall (kg/ha)	3104	0	15662	1372	44.0
3 DM 12 weeks during max rainfall (kg/ha)	7560	0	23400	2648	35.0
4 Dry rainy season ratio in DM production	43	0	1.4		
<b>HERBACEOUS LEGUMES</b>					
1 % of cover 12 weeks after establishment (%)	65	1	100	13	20.0
2 DM 12 weeks during min rainfall (kg/ha)	1619	0	9336	939	58.0
3 DM 12 weeks during max rainfall (kg/ha)	3400	0	13834	1241	37.0
4 Dry rainy season ratio in DM production	54	0	3.9		
<b>TREE LEGUMES</b>					
1 Plant height 12 weeks after establishment (cm)	70	9	188	15	22.0
2 Plant height 12 weeks during min rainfall (cm)	91	28	192	13	15.0
3 Plant height 12 weeks during max rainfall (cm)	120	50	234	21	17.0
4 Dry Rainy season ratio in plant height	8	3	2.3		
5 DM 12 weeks during min rainfall (kg/ha)	1703	40	8448	542	32.0
6 DM 12 weeks during max rainfall (kg/ha)	2524	200	8309	1078	43.0
7 Dry Rainy season ratio in DM	7	1	40		

<sup>11</sup> Corresponds to the V MS Error i.e. the SD and CV calculated after removing all sources of variability affecting the response variable

Table 4 Location Means

Indicator	Kovie (Togo)	Bouake (Ivory Coast)	Avetonou (Togo)	Kurmin Bire (Nigeria)
<b>GRASSES</b>				
1 % cover 12 weeks establishment (%)	71	48	68	90
2 DM 12 weeks min rainfall (kg/ha)	7938	2659	921	805
3 DM 12 weeks max rainfall (kg/ha)	10396	12617	1884	5102
4 Dry Rainy season ratio in DM	80	2	5	2
<b>HERBACEOUS LEGUMES</b>				
1 % cover 12 weeks establishment (%)	50	77	67	67
2 DM 12 weeks min rainfall (kg/ha)	3079	1616	1164	470
3 DM 12 weeks max rainfall (kg/ha)	3198	5418	1364	3722
4 Dry Rainy season ratio in DM	9	3	8	1
<b>TREE LEGUMES</b>				
1 Plant height 12 weeks establishment (cm)	86		67	39
2 Plant height 12 weeks min rainfall (cm)	114		119	46
3 Plant height 12 weeks max rainfall (cm)	140		108	114
4 Dry Rainy season ratio in plant height	8		12	4
5 DM 12 weeks min rainfall (kg/ha)	5329	842	2188	483
6 DM 12 weeks max rainfall (kg/ha)	2039	2532	1084	3907
7 Dry Rainy season ratio	13	6	20	1

Table 5 Results of combined analysis across locations GRASSES

PRINCIPAL COMPONENT ANALYSIS ON INDICATORS (78% of variance explained)

Indicator	Principal Component 1 (44%)	Principal Component 2 (34%)
	SCORES	
% cover 12 weeks establishment	-0.34	-0.53
% cover at 4 weeks/% cover at 12 weeks establishment	-0.39	0.46
DM 12 weeks min rainfall (kg/ha)	0.53	0.36
DM 12 weeks max rainfall (kg/ha)	0.62	-0.06
dry rainy season ratio in DM	-0.25	0.61

"High DM production"

High Dry Rainy Season ratio but relatively low cover % during establishment

**Table 6 Results of combined analysis across locations GRASSES**  
**Ecotype Least-squares means on resulting principal components**

ECOTYPE	PRIN 1 ( <sup>2</sup> DM production )	ECOTYPE	PRIN 2 (High Dry Rainy season ratio, but low % cover during establishment)
<i>B. brizantha</i> 26664	0.34	<i>B. dictyoneura</i> 6133	0.46
<i>A. gayanus</i> 621	0.21	<i>B. brizantha</i> 26646	0.44
<i>B. dictyoneura</i> 6133	0.08	<i>B. decumbens</i> 606	0.18
<i>B. decumbens</i> 606	0.05	<i>B. humidicola</i> 6369	0.12
<i>P. maximum</i> 673	0.05	<i>P. maximum</i> 673	0.07
<i>B. brizantha</i> 6780	-0.07	<i>B. brizantha</i> 6780	-0.08
<i>B. humidicola</i> 6369	-0.30	<i>P. maximum</i> 16031	-0.47
<i>P. maximum</i> 16031	-0.48	<i>A. gayanus</i> 621	-0.52
OVERALL MEAN	0.0		0.0
SD = $\sqrt{\text{MSError}}$	0.41		0.58
LSD ecotype 5%	0.39		0.56



Table 7 Results of combined analysis across locations HERBACEOUS LEGUMES

PRINCIPAL COMPONENT ANALYSIS ON INDICATORS (76% of variance explained)

Indicator	Principal Component 1 (46%)	Principal Component 2 (30%)
	SCORES	
% cover 12 weeks establishment	-0.31	-0.35
DM 12 weeks min rainfall	0.70	0.05
DM 12 weeks max rainfall	0.18	0.81
Dry Rainy season ratio in DM	0.61	-0.47

14

High Dry rainy season ratio  
and high DM production during  
min rainfall

High DM production  
during max rainfall

Table 8 Results of combined analysis across locations HERBACEOUS LEGUMES  
Ecotype performance indicators Least-square means on resulting Principal components and individual indicators

Ecotype	PRIN 1	PRIN 2	Performance Indicators			
			% cover 12 weeks of establishment	DM 12 weeks min rainfall (kg/ha)	DM-12 weeks max rainfall (kg/ha)	Dry: Rainy season ratio in DM
<i>D strigillosum</i> 13155	1.01	-0.30	25	1625	1979	82
<i>S guianensis</i> 10136	1.00	0.32	42	3998	4644	86
<i>C macrocarpum</i> 5713	0.41	-0.31	75	2525	3607	70
<i>C macrocarpum</i> 5452	0.33	-0.24	72	2403	3431	70
<i>C acutifolium</i> 5277	0.26	-0.67	64	1645	2600	63
<i>C acutifolium</i> 5568	0.06	-0.22	78	1918	3441	56
<i>C brasilianum</i> 5234	0.02	-0.65	91	2210	2434	91
<i>C pubescens</i> 5172	0.01	-0.51	94	2196	3335	66
<i>A histrix</i> 9690	0.005	0.68	71	1931	5152	37
<i>A pintoi</i> 8279	-0.05	0.00	64	1164	2676	43
<i>Z Glabra</i> 147	-0.16	0.69	65	1302	5087	26
<i>C rotundifolia</i> 13089	-0.26	-0.08	48	1195	2335	51
<i>S hamata</i> 3	-0.30	0.52	77	1427	5194	27
<i>S macrocephala</i> 1044	-0.47	0.83	36	273	3304	08
<i>S sympodiales</i> 2	-0.55	-0.60	87	715	2419	30
<i>S capitata</i> 17434	-0.62	-0.45	59	615	1482	41
OVERALL MEAN	0.0	0.0	63	1854	2855	48
SD = $\sqrt{MS \text{ Error}}$	0.31	0.41	13	856	951	
LSD Ecotype 5%	0.32	0.41	12	791	878	

15

BIBLIOTECA



Figure 1. Classification of Ecotypes According to the two first Principal Components - GRASSES

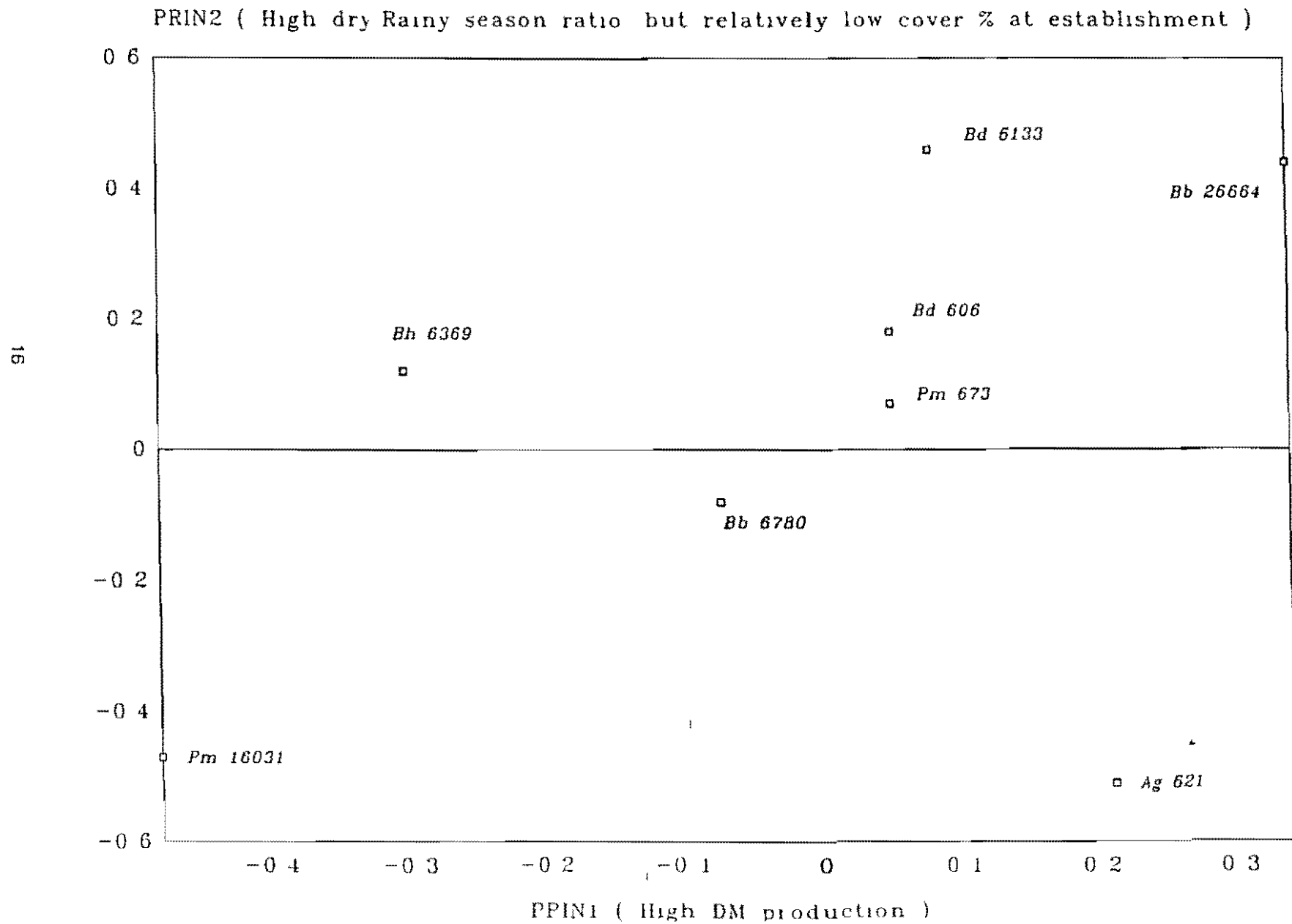
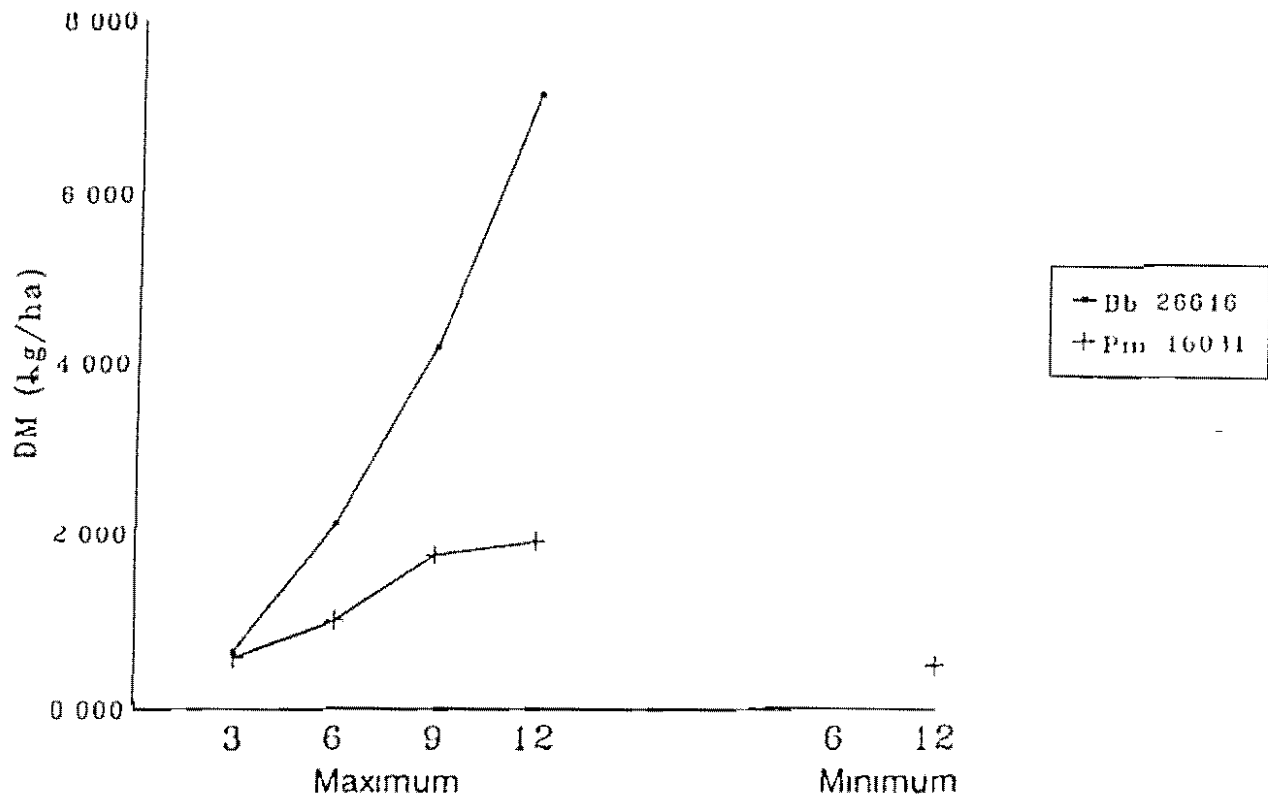


Figure 3

**OUTSTANDING GRASS (Bb 26646) vs  
NON - ADAPTED ECOTYPE (Pm 16031)  
KURMIN BIRE**



**OUTSTANDING LEGUME (Sg 10136) vs  
NON - ADAPTED ECOTYPE (Cr -2)  
KURMIN BIRE**

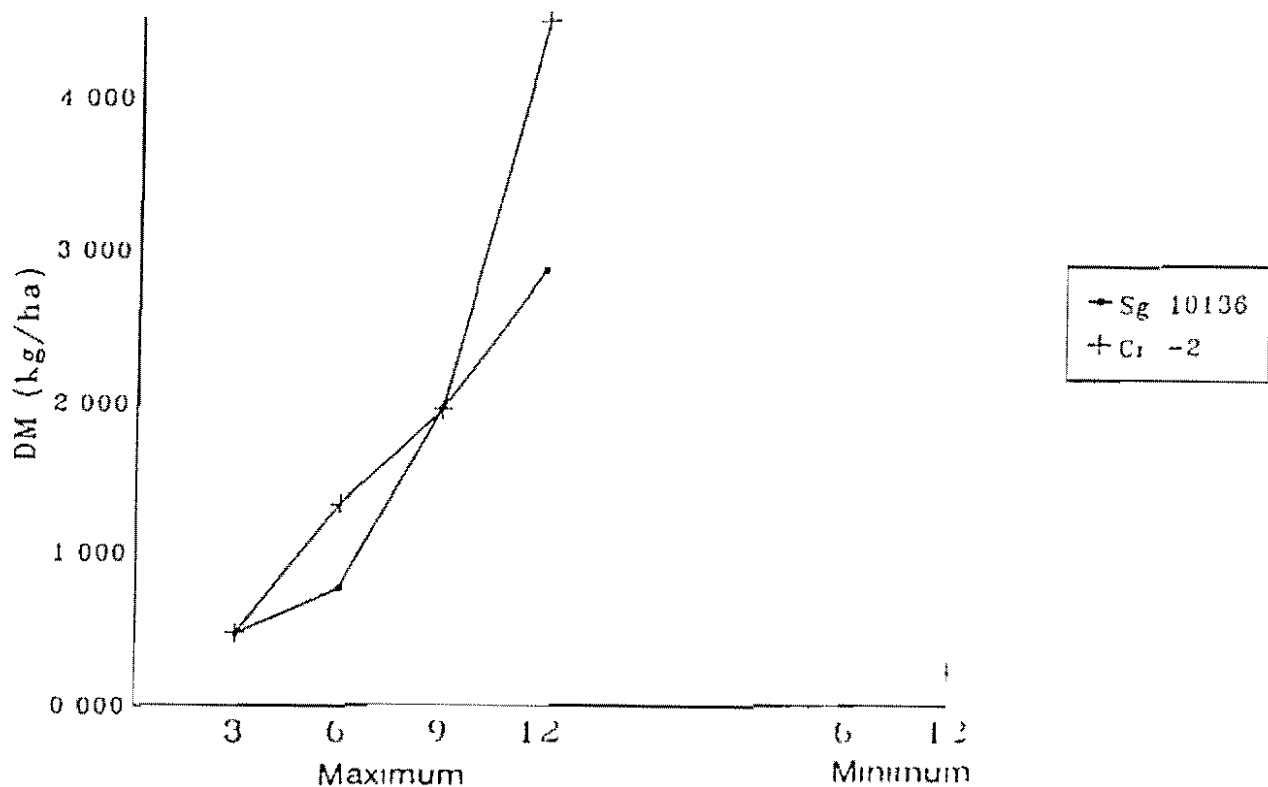
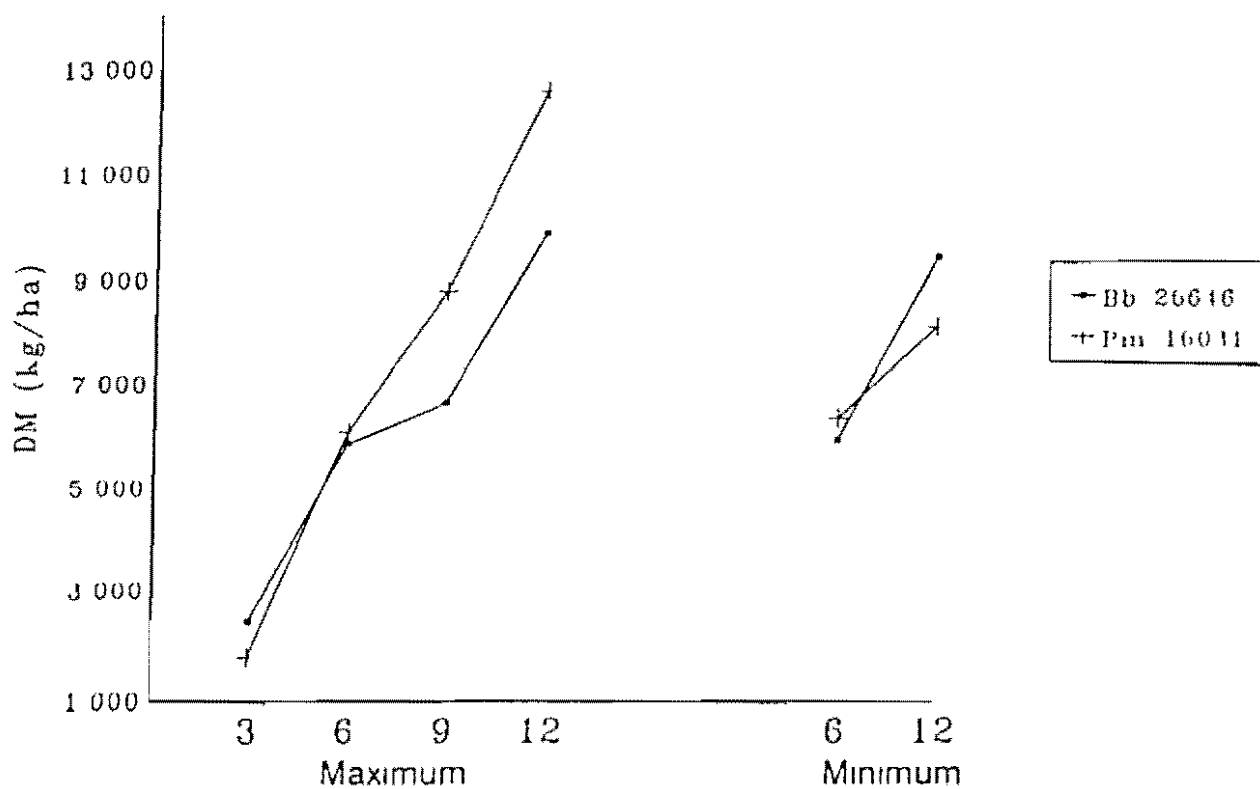


Figure 4

OUTSTANDING GRASS (Bb 26646) vs  
NON - ADAPTED ECOTYPE (Pm 16031)  
KOVIE



OUTSTANDING LEGUME (Sg 10136) vs  
NON - ADAPTED ECOTYPE (Cr -2)  
KOVIE

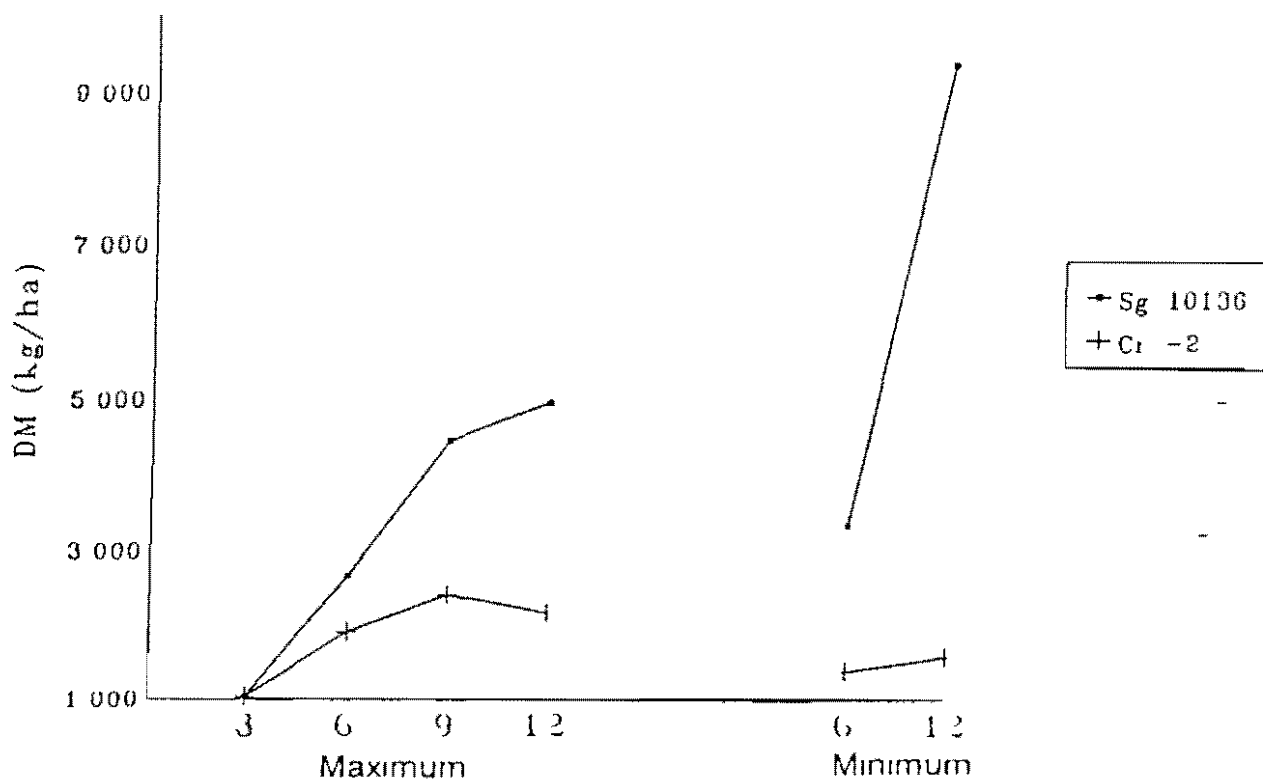
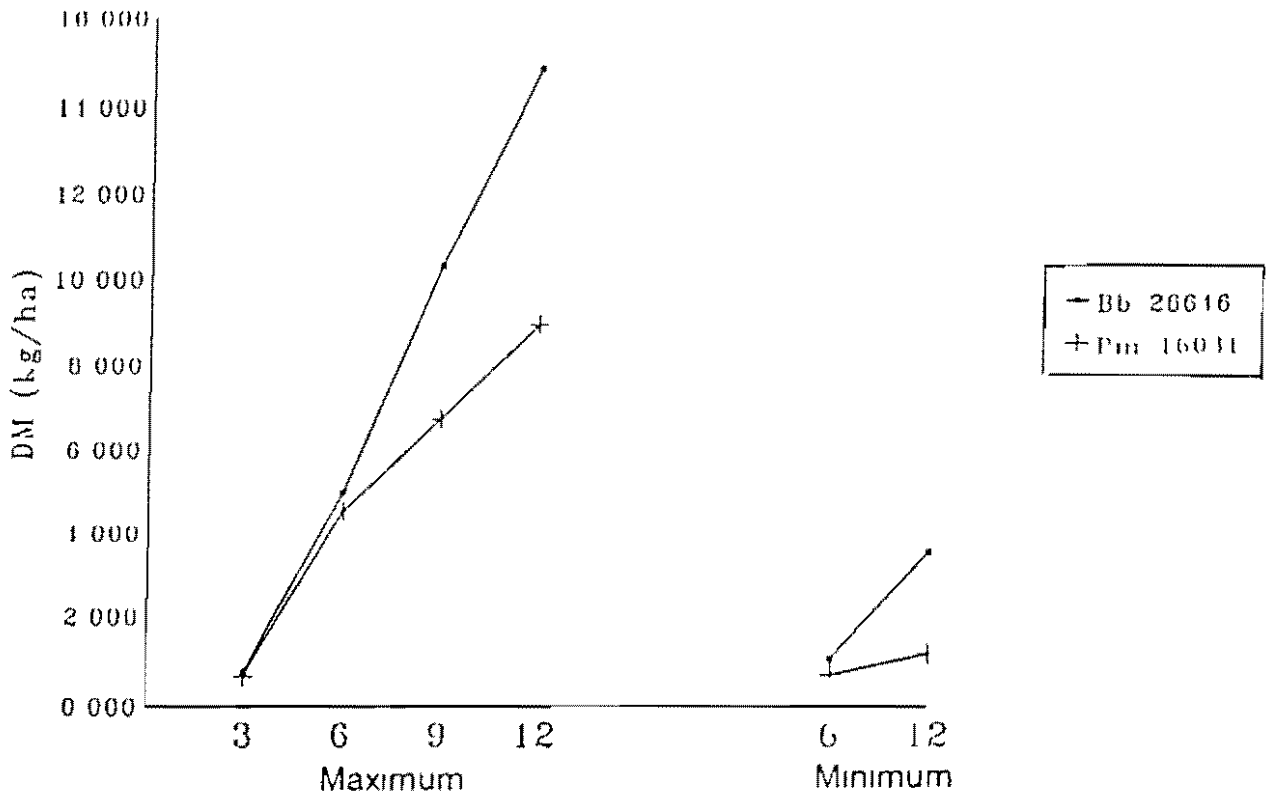


Figure 5

OUTSTANDING GRASS (Bb 26646) vs  
NON - ADAPTED ECOTYPE (Pm 16031)  
BOUAKE



OUTSTANDING LEGUME (Sg 10136) vs  
NON - ADAPTED ECOTYPE (Cr -2)  
BOUAKE

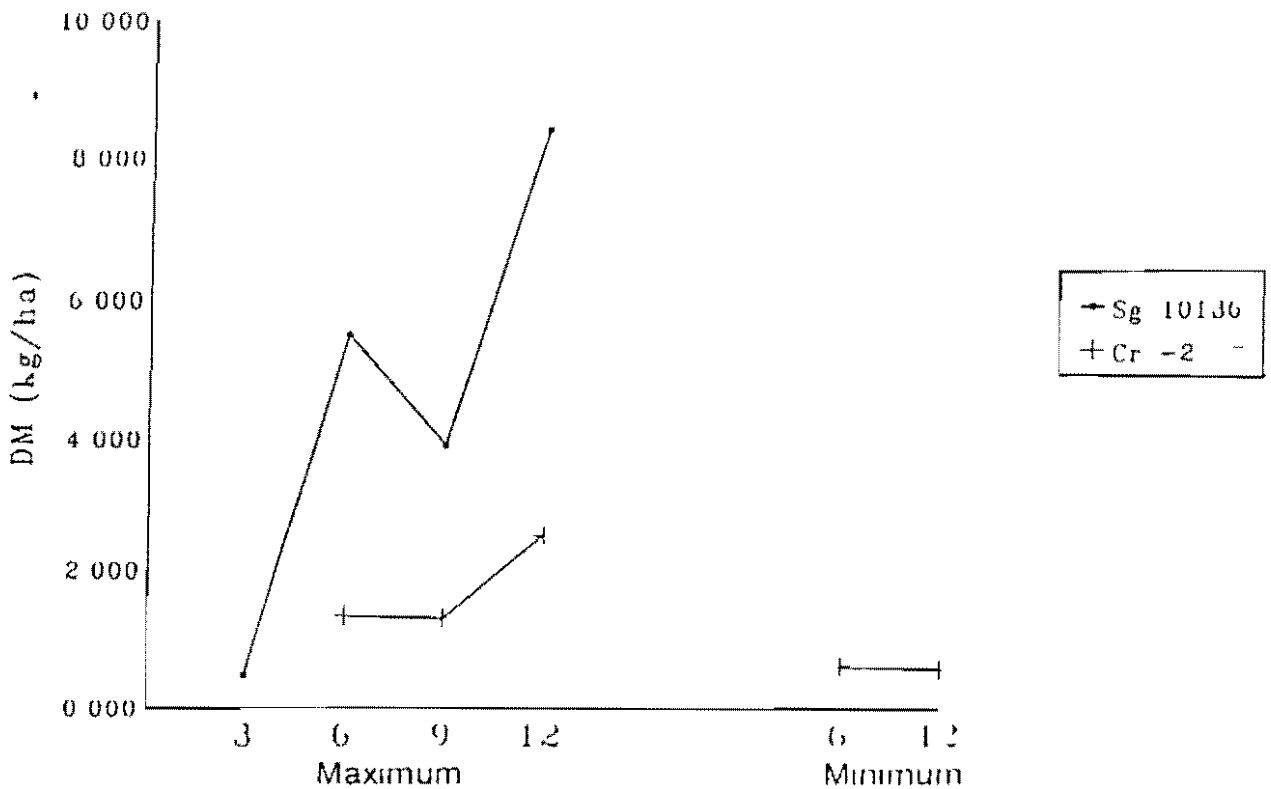
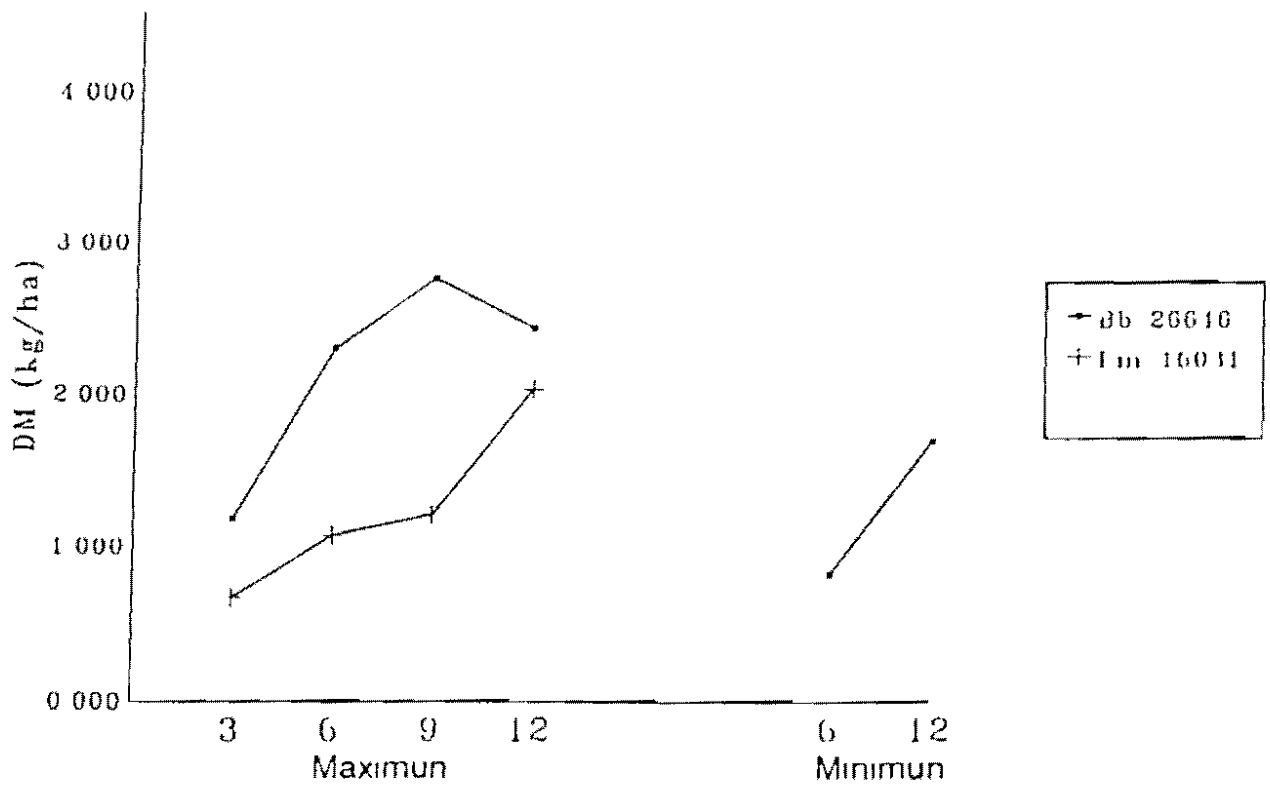
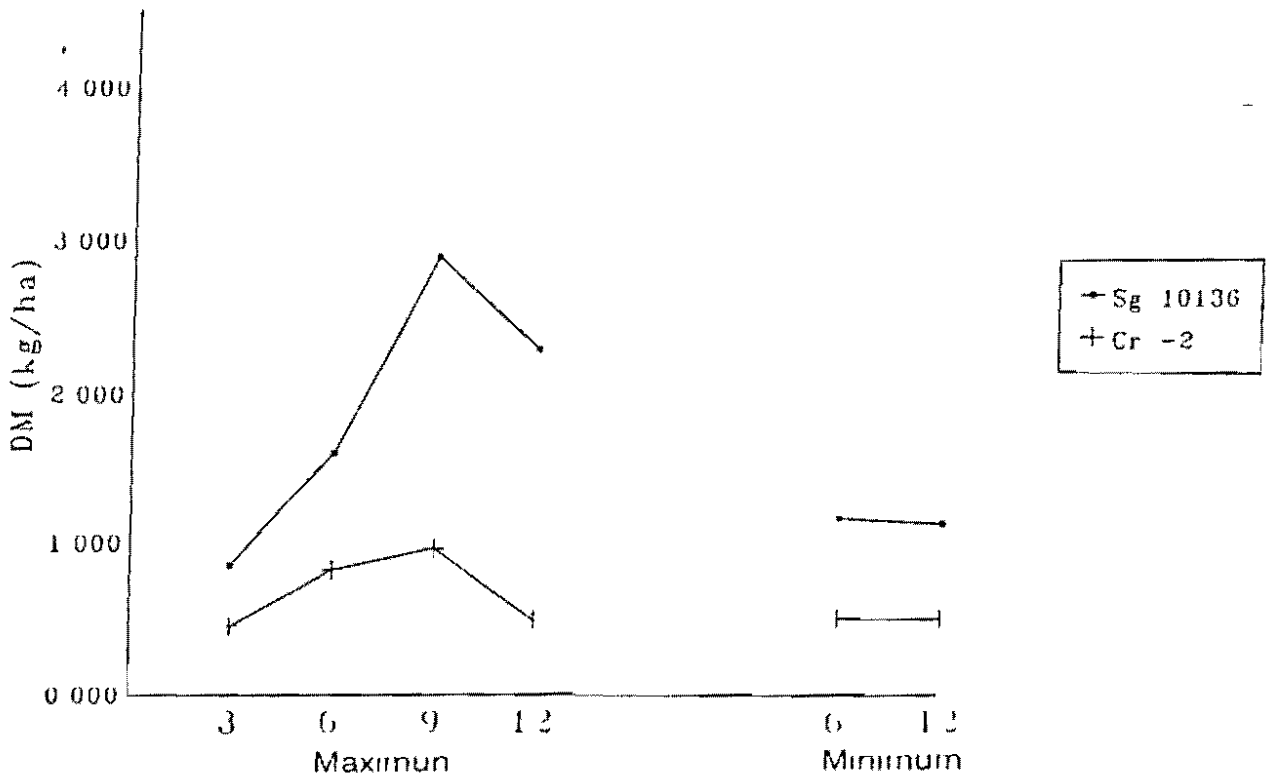


Figure 6

OUTSTANDING GRASS (Bb 26646) vs  
NON - ADAPTED ECOTYPE (Pm 16031)  
AVETONOU



OUTSTANDING LEGUME (Sg 10136) vs  
NON ADAPTED ECOTYPE (Cr 2)  
AVETONOU



## Annex

### Results of Statistical Analysis per Location

Tables 1 1 - 1 3 Kurmin Biri (Nigeria)  
Tables 2 1 - 2 6 Kovie (Togo)  
Tables 3 1 - 3 6 Bouaké (Ivory Coast)  
Tables 4 1 - 4 3 Avetonou (Togo)



LOCATION KURMIN BIRE (NIGERIA)

Table 1 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
26646	<i>Brachiaria brizantha</i>	1651	90	4	7137	23
606	<i>Brachiaria decumbens</i>	1090	93	4	4624	23
6780	<i>Brachiaria brizantha</i>	763	90	5	4920	16
621	<i>Andropogon gayanus</i>	737	85	3	5845	12
6133	<i>Brachiaria dictyoneura</i>	691	82	3	7972	10
6369	<i>Brachiaria humidicola</i>	607	95	4	4817	12
16031	<i>Panicum maximum</i>	477	90	9	1904	21
673	<i>Panicum maximum</i>	423	92	7	3594	13
Mean		805	90	5	5102	16
Min Max		0 2005	75 95	1 11	1166 9320	0 33
SD <sup>2)</sup>		271 2	5 2	2 6	1146 4	16
CV % <sup>2)</sup>		34	6	52	22	45
LSD Ecotype 5%		474	9	4	2004	13
Corr coeff with % cover at 12 weeks (establ )		0 07 ns			-0 19 ns	0 08 ns
Corr coeff with DM 12 weeks max rainfall		0 48 *	-0 19 ns	0 50 *		

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

Table 1 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
10136	<i>Stylosanthes guianensis</i>	1237	45	5	2866	43
184	<i>Stylosanthes guianensis</i>	1152	80	8	7570	15
5234	<i>Centrosema brasiliianum</i>	1059	86	4	2701	41
5452	<i>Centrosema macrocarpum</i>	907	60	3	3784	26
5713	<i>Centrosema macrocarpum</i>	803	72	4	4316	18
5172	<i>Centrosema pubescens</i>	750	97	4	3284	27
5568	<i>Centrosema acutifolium</i>	440	65	3	3641	12
9690	<i>Aeschynomene histrix</i>	437	73	5	3573	12
1044	<i>Stylosanthes sympodiales</i>	383	83	2	4579	08
13089	<i>Desmodium ovalifolium</i>	360	55	5	3911	08
8279	<i>Zornia glabra</i>	310	70	3	2510	12
10280	<i>Stylosanthes capitata</i>	300	40	7	1355	20
147	<i>Stylosanthes hamata</i>	290	67	7	2313	12
728	<i>Zornia latifolia</i>	263	78	2	4403	06
5277	<i>Centrosema acutifolium</i>	230	52	4	2744	09
2	<i>Cassia rotundifolia</i>	217	94	6	4477	05
1281	<i>Stylosanthes macrocephala</i>	200	45	2	2388	07
13155	<i>Desmodium stngillosum</i>	167	20	10	4212	04
17434	<i>Arachis pintoi</i>	130	48	4	1568	08
3	<i>Stylosanthes hamata</i>	130	87	3	5821	02
1	<i>Centrosema pascuorum</i>	113	98	4	6152	04
Mean		470	67	5	3722	14
Min Max		0-1781	15-100	1-2-13-3	0-9992	0-65
SD <sup>2)</sup>		224	11.6	1.6	1402	09
CV % <sup>2)</sup>		48	17.2	35	38	59
LSD Ecotype 5%		369	19	3	2314	2-
Corr coeff with % cover at 12 weeks (establishment)		0.13 ns			0.39*	0.01 ns
Corr coeff with DM 12 weeks max rainfall		0.17 ns	0.39 *	0.09 ns		

Ordered by DM 12 production during minimum rainfall

Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KURMIN BIRE (NIGERIA)

Table 1.3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	OTHER INDICATORS					
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry-rainy season ratio in terms of plant height
3001	<i>Codariocalix giroides</i>	1025	41	4694	21	116	44	38
18700	<i>Cajanus cajan</i>	897	110	3432	26	131	85	65
17403	<i>Flemingia macrophyla</i>	536	22	4617	12	113	36	33
17502	<i>Leucaena leucocephala</i>	220	31	2974	7	112	39	36
33138	<i>Desmodium velutinum</i>	120	15	5461	2	116	35	30
18516	<i>Cratylia argentea</i>	97	16	2265	8	100	38	40
Mean		483	39	3907	13	114	46	40
Min Max		40 1826	9 123	500-8309	1 34	65 157	28-89	27 69
SD <sup>2)</sup>		311	8	1345	5 9	18	4 3	07
CV % <sup>2)</sup>		64 5	20 1	34 4	47	15 4	9 3	16
LSD Ecotype 5%		566	14	2442	11	32	8	12
Corr coeff with plant height 12 weeks (Establ)		0 58 *		-0 05 ns	0 73 **	0 33 ns	0 91 **	0 88 **
Corr coeff with DM 12 weeks max rainfall		0 29 ns	-0 05 ns			0 66 **	0 10 ns	-0 62 ns

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KOVIE (TOGO)

Table 2 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
606	<i>Brachiaria decumbens</i>	10356	63		12576	86
621	<i>Andropogon gayanus</i>	10068	83		16346	59
26646	<i>Brachiaria brizantha</i>	9435	70		9888	99
6780	<i>Brachiaria brizantha</i>	8812	82		8570	1 03
16031	<i>Panicum maximum</i>	8099	81		12571	65
673	<i>Panicum maximum</i>	7232	85		15111	48
6133	<i>Brachiaria dictyoneura</i>	6419	34		3905	1 16
6369	<i>Brachiaria humidicola</i>	3087	68		4197	75
Mean		7 938	71		10396	80
Min Max		2616 15622	16 98		0 23400	31 1 37
SD <sup>2)</sup>		2356	16		3164	19
CV % <sup>2)</sup>		30	23		30	24
LSD Ecotype 5%		4118	28		5531	34
Corr coef with % cover at 12 weeks (establ)		0 05 ns			0 27 ns	-0 26 ns
Corr coef with DM 12 weeks max rainfall		0 65 **	0 27 ns			

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

... .. ID L class production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM-12 weeks
10136	<i>Stylosanthes guianensis</i>	9366	12		4979	19
9690	<i>Aeschynomene histrix</i>	5672	51		6682	86
5713	<i>Centrosema macrocarpum</i>	5112	59		3534	1.5
5452	<i>Centrosema macrocarpum</i>	4926	71		3528	1.4
5234	<i>Centrosema brasilianum</i>	4854	66		3638	1.4
5172	<i>Centrosema pubescens</i>	4758	86		3854	1.3
5568	<i>Centrosema acutifolium</i>	4294	61		3680	1.1
13155	<i>Desmodium stngilosum</i>	4174	5		577	3.9
5277	<i>Centrosema acutifolium</i>	3903	42		2800	1.4
147	<i>Stylosanthes hamata</i>	3794	44		7050	55
728	<i>Zornia latifolia</i>	3417	14		0	
3	<i>Stylosanthes hamata</i>	3116	80		5173	69
13089	<i>Desmodium ovalifolium</i>	2321	24		2415	99
8279	<i>Zornia glabra</i>	2211	58		3406	45
2	<i>Cassia rotundifolia</i>	1568	85		2175	72
17434	<i>Arachis pintoi</i>	1171	41		586	53
1	<i>Centrosema pascuorum</i>	0	99		4790	0
10280	<i>Stylosanthes capitata</i>	0	15		3876	0
1044	<i>Stylosanthes sympodioides</i>	0	6		3310	0
1281	<i>Stylosanthes macrocephala</i>	0	9		734	0
184	<i>Stylosanthes guianensis</i>	0			0	
Mean		3079	50		3189	94
Min Max		0-11160	3-100		0-7712	0-3.9
SD <sup>2)</sup>		1315	17		1191	24
CV % <sup>2)</sup>		43	34		37	25
LSD Ecotype 5%		2171	30		1965	46
Corr coeff with % cover at 12 weeks (Establishment)		-0.06 ns			0.24 ns	-0.00 ns
Corr coeff with DM 12 weeks max rainfall		0.38 *	0.24 ns			

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

Table 2 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1</sup>	Most important indicator	OTHER INDICATORS					
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM-12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry-rainy season ratio in terms of plant height
17403	<i>Flemingia macrophylla</i>	6211	30	3174	193	74	71	97
18700	<i>Cajanus cajan</i>	5066	127	4529	110	148	106	71
17502	<i>Leucaena leucocephala</i>	4709	100	5209	91	227	166	72
18516	<i>Cratylia argentea</i>			0				
3001	<i>Codariocalix giroides</i>			0				
33138	<i>Desmodium velutinum</i>			0				
Mean		5329	86	2039	131	140	114	81
Min Max		2569-8448	13 144	0-6033	50 212	67 234	65 174	66-1 1
SD <sup>2</sup>		205	20	651	17	10	9	07
CV % <sup>2</sup>		4	23	32	13	7	8	9
LSD Ecotype 5%		467	45	1144	39	28	20	21
Corr coef with plant height 12 weeks (Estab)		0 13 ns		0 63 ns	-0 52 ns	0 60 ns	0 55 ns	-0 55 ns
Corr coeff with DM 12 weeks max rainfall		0 28 ns	0 63 ns			0 78 *	0 77 *	-0 30 ns

<sup>1</sup> Ordered by DM production during minimum rainfall

<sup>2</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KOVIE (TOGO)

Table 2 4 Second Biomass production evaluation GRASSES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
26646	<i>B brizantha</i>	4971
621	<i>A gayanus</i>	4946
16031	<i>P maximum</i>	3949
606	<i>B decuambens</i>	3650
673	<i>P maximum</i>	3592
6369	<i>B humidicola</i>	3580
6133	<i>B dictyoneura</i>	3016
6780	<i>B brizantha</i>	2356
Mean		3758
Min Max		1645-6765
SD <sup>1</sup>		938
CV % <sup>1</sup>		25
LSD Ecotype 5%		1639

<sup>1</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION KOVIE (TOGO)

Table 2 5 Second Biomass production evaluation HERBACEOUS LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
-3	<i>S hamata</i>	5790
147	<i>S hamata</i>	4659
8279	<i>C glabra</i>	3769
5713	<i>C macrocarpum</i>	3256
5568	<i>C acutifolium</i>	3162
5172	<i>C pubescens</i>	2782
17434	<i>A pintoi</i>	2707
5452	<i>C macrocarpum</i>	2616
1	<i>C pascuorum</i>	2611
13155	<i>D strigillosum</i>	2281
728	<i>Z latifolia</i>	2085
13089	<i>D ovalifolium</i>	2045
9690	<i>A histrix</i>	2041
1281	<i>S macrocephala</i>	1685
10136	<i>S guianensis</i>	1636
10918	<i>S scabra</i>	1594
5277	<i>C acutifolium</i>	1577
5234	<i>C brasilianum</i>	1276
10280	<i>S capitata</i>	844
Mean		2569
Min Max		650 7238
SD <sup>11</sup>		967
CV % <sup>11</sup>		38
LSD Ecotype 5%		1669

<sup>11</sup> Computed after removing variation due to sources of variability in the ANOVA Model



LOCATION KOVIE (TOGO)

Table 2 6 Second Biomass production evaluation TREE LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
17403	<i>F macrophylla</i>	4307
18700	<i>C cajan</i>	4186
17502	<i>L leucocephala</i>	3481
Mean		3991
Min Max		2388 5404
SD <sup>1)</sup>		597
CV % <sup>1)</sup>		15
LSD Ecotype 5%		1357

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION BOUAKE (IVORY COAST)

Table 3 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
6133	<i>Brachiaria humidicola</i>	4666	47	4	9106	49
26646	<i>Brachiaria brizantha</i>	3537	19	11	14815	25
673	<i>Panicum maximum</i>	3386	31	10	14176	24
621	<i>Andropogon gayanus</i>	2748	82	1	20270	14
606	<i>Brachiaria decumbens</i>	2283	48	7	15059	17
6369	<i>Brachiaria humidicola</i>	1903	30	7	6389	31
6780	<i>Brachiaria brizantha</i>	1610	33	13	12177	13
16031	<i>Panicum maximum</i>	1140	97	6	8946	14
Mean		2659	48	7	12617	23
Min Max		1070-6635	3 100	1-33	5193 22483	07 70
SD <sup>2</sup>		1249	31	10	3894	10
CV % <sup>2</sup>		47	67	137	31	44
LSD Ecotype 5%		2183	56	18	6806	18
Corr coeff with % cover at 12 weeks (establ)		-0.34 ns			-0.07 ns	-0.31 ns
Corr coeff with DM 12 weeks max rainfall		0.27 ns	-0.07 ns	0.13 ns		

Ordered by DM production during minimum rainfall

<sup>2</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION BOUAKÉ (IVORY COAST)

Table 3 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM-12 weeks
10136	<i>Stylosanthes guianensis</i>	4250	59	2	8423	53
184	<i>Stylosanthes guianensis</i>	2367	97	1	11207	22
5713	<i>Centrosema macrocarpum</i>	2174	89	1	5192	45
5452	<i>Centrosema macrocarpum</i>	2070	93	1	4892	44
5234	<i>Centrosema brasilianum</i>	1760	100	1	2092	84
5172	<i>Centrosema pubescens</i>	1628	100	1	4493	37
5568	<i>Centrosema acutifolium</i>	1370	93	1	4837	28
5277	<i>Centrosema acutifolium</i>	1097	93	1	3764	31
9690	<i>Aeschynomene histrix</i>	1020	95	1	8004	13
8279	<i>Zornia glabra</i>	727			3520	21
2	<i>Cassia rotundifolia</i>	570			2531	23
147	<i>Stylosanthes capitata</i>	357	93	1	8679	05
3	<i>Stylosanthes hamata</i>				7995	
10280	<i>Stylosanthes capitata</i>		80	1	5550	
1	<i>Centrosema pascuorum</i>				5015	
17434	<i>Arachis pintoi</i>		90	1	3226	
1281	<i>Stylosanthes macrocephala</i>		65	2	3093	
13089	<i>Desmodium ovalifolium</i>		33	3		
1044	<i>Stylosanthes sympodioides</i>		30	4		
13155	<i>Desmodium strigillosum</i>		6	10		08
Mean		1616	77	1.7	5418	34
Min Max		350-9336	1-100	1-10	1886-13834	03-12
SD <sup>2)</sup>		1281	14	1	1595	19
C.V. % <sup>2)</sup>		79	18	38	29	57
LSD Ecotype 5%		2166	24	1.2	2604	33
Corr coeff with % cover at 12 weeks (Establishment)		-0.72			0.05 ns	-0.39
Corr coeff with DM 12 weeks max rainfall		0.17 ns	0.05 ns	0.004 ns		

<sup>1)</sup> Cited by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION BOUAKE (IVORY COAST)

Table 3 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1</sup>	Most important indicator	OTHER INDICATORS				
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production			
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)
18516	<i>Cratylia argentea</i>	1183		653	20		
18700	<i>Cajanus cajan</i>	1173		2046	57		-
17502	<i>Leucaena leucocephala</i>	1167		4384	35		
3001	<i>Codariocalix giroides</i>	577		4900	11		
17403	<i>Flemingia macrophylla</i>	560		2428	25		
33138	<i>Desmodium velutinum</i>	393		780	59		-
Mean		842		2532	64		
Min Max		270 1410		420 7341	09 2 5		
SD <sup>2</sup>		266		1328	31		
CV % <sup>2</sup>		32		52	49		
LSD Ecotype 5%		484		2411	57		
Corr coef with DM 12 weeks max rainfall		0 01 ns					

<sup>1</sup> Ordered by DM production during minimum rainfall

<sup>2</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION BOUAKE (IVORY COAST)

Table 3 4 Second Biomass production evaluation GRASSES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
673	<i>P maximum</i>	4430
6780	<i>B brizantha</i>	4043
606	<i>B decumbens</i>	3740
26646	<i>B brizantha</i>	3710
6369	<i>B humidicola</i>	3513
6133	<i>B dictyoneura</i>	3470
621	<i>A gayanus</i>	3107
16031	<i>P maximum</i>	2840
Mean		3607
Min Max		1950 5610
SD "		1108
CV % "		31
LSD Ecotype 5%		1937

" Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION BOUAKE (IVORY COAST)

Table 3 5 Second Biomass production evaluation HERBACEOUS LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
184	<i>S guianensis</i>	4997
-3	<i>S hamata</i>	4833
5713	<i>C macrocarpum</i>	4377
5452	<i>C macrocarpum</i>	3730
5172	<i>C pubescens</i>	3043
5568	<i>C acutifolium</i>	2623
8279	<i>Z glabra</i>	2263
2	<i>C rotundifolia</i>	2247
13089	<i>D ovalifolium</i>	2047
10280	<i>S capitata</i>	2010
147	<i>S hamata</i>	1990
17434	<i>A pintoi</i>	1747
5277	<i>C acutifolium</i>	1450
Mean		2866
Min Max		1110-6150
SD <sup>1)</sup>		634
CV % <sup>1)</sup>		22
LSD Ecotype 5%		1068

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION BOUAKE (IVORY COAST)

Table 3 6 Second Biomass production evaluation TREE LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
17502	<i>L. leucocephala</i>	7580
17403	<i>F. macrophylla</i>	4977
18700	<i>C. cajan</i>	4563
18516	<i>C. argentea</i>	3957
Mean		5269
Min Max		2140 9990
SD <sup>1)</sup>		1197
CV % <sup>1)</sup>		23
LSD Ecotype 5%		2392

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION AVETONOU (TOGO)

Table 4 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1</sup>	Most important indicator	Other indicators			
		GM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	GM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of GM 12 weeks
26646	<i>Brachiaria brizantha</i>	11333	75	51	16267	67
606	<i>Brachiaria decumbens</i>	11067	70	46	14200	83
6133	<i>Brachiaria dictyoneura</i>	5500	70	52	9200	71
6780	<i>Brachiaria brizantha</i>	5200	66	44	11400	51
6369	<i>Brachiaria humidicola</i>	4500	67	49	6800	70
621	<i>Andropogon gayanus</i>	4000	74	37	11067	37
673	<i>Panicum maximum</i>	3900	58	72	17133	28
16031	<i>Panicum maximum</i>	3400	63	57	13533	33
Mean		6139	68	51	12591	54
Min Max		1900 18500	40 84	18 103	5000 28600	13 1 2
SD <sup>2</sup>		3159	8	17	7093	24
CV % <sup>2</sup>		51	12	34	56	45
LSD Ecotype 5%		5733	14	31	12873	44
Corr coef with % cover at 12 weeks (Establ )		0 11 ns			-0 22 ns	0 11 ns
Corr coeff with DM 12 weeks max rainfall		0 39 ns	-0 22 ns	-0 07 ns		

<sup>1</sup> Ordered by GM production during minimum rainfall

<sup>2</sup> Computed after removing variation due to sources of variability described in the ANOVA model



Table 4.2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		GM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	GM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of GM 12 weeks
5713	<i>Centrosema macrocarpum</i>	10067	79	12	6933	1.5
5452	<i>Centrosema macrocarpum</i>	8533	65	17	7600	1.1
184	<i>Stylosanthes guianensis</i>	8500	63	15	15267	57
5172	<i>Centrosema pubescens</i>	8233	92	29	8533	1.1
5568	<i>Centrosema acutifolium</i>	7833	91	21	7133	1.2
8279	<i>Zornia glabra</i>	7033	61	16	6333	1.2
5277	<i>Centrosema acutifolium</i>	6000	70	11	5467	1.2
5234	<i>Centrosema brasilianum</i>	5833	92	31	6533	.84
10136	<i>Stylosanthes guianensis</i>	5700	51	10	11533	61
-3	<i>Stylosanthes hamata</i>	5167	63	19	8933	59
147	<i>Stylosanthes hamata</i>	3833	55	22	11533	35
1044	<i>Stylosanthes sympodioides</i>	3800	34	16	6900	40
9690	<i>Aeschynomene histrix</i>	2983	63	28	11733	30
13155	<i>Desmodium stngillosum</i>	2667	62	10	5733	44
2	<i>Cassia rotundifolia</i>	2533	82	23	2467	1.2
17434	<i>Arachis pintoi</i>	2000	58	11	2733	43
13089	<i>Desmodium ovalifolium</i>	1600	78	9	3400	32
728	<i>Zornia latifolia</i>		66	5	2300	
10280	<i>Stylosanthes capitata</i>		50	11	1067	
1281	<i>Stylosanthes macrocephala</i>		51	9	800	
1	<i>Centrosema pascuorum</i>		73	7		
Mean		5817	67	16	6821	83
Min Max		1000-11700	18-98	4-58	200-18400	18-2.1
SD <sup>2)</sup>		1984	9	7	2173	28
CV % <sup>2)</sup>		34	14	46	32	34
LSD Ecotype 5%		4051	15	12	3734	57
Corr coeff with % cover at 12 weeks (Establishment)		0.17 ns			-0.003 ns	0.30
Corr coeff with DM 12 weeks max rainfall		0.22 ns	-0.063 ns	0.17 ns		

<sup>1)</sup> Ordered by GM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION AVETONOU (TOGO)

Table 4.3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1</sup>	Most important indicator	OTHER INDICATORS					
			GM 12 weeks during min rainfall (kg/ha)	Establishment	Production			
		Plant height at 12 weeks (cm)		GM 12 weeks during max rainfall (kg/ha)	Dry-rainy season ratio in terms of GM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry-rainy season ratio in terms of plant height
17502	<i>Leucaena leucocephala</i>	12667	34	2933	15.3	96	154	1.7
18700	<i>Cajanus cajan</i>	11900	168	6133	1.8	132	155	1.1
17403	<i>Flemingia microphylla</i>	10867	540	5600	2.0	103	97	93
3001	<i>Codariocalix giroides</i>	7500	40	7800	92	101	63	76
18516	<i>Cratylia argentea</i>		10					
Mean		10940	67	5418	6.3	108	119	1.2
Min Max		5600 22000	10 188	200 9200	40 0	50 153	61 192	2.3
SD <sup>2</sup>		6310	15	2687	13.7	27	23	38
CV % <sup>2</sup>		58	23	50	216	25	19	31
LSD Ecotype 5%		16022	34	5988	45.3	59	58	1.3
Corr coeff with plant height 12 weeks (Estab)		0.16 ns		0.40 ns	-0.36 ns	0.67 *	0.42 ns	
Corr coeff with DM 12 weeks max rainfall		0.52 ns	0.40 ns			0.64 *	0.10 ns	-0.62 ns

<sup>1</sup> Ordered by GM production during minimum rainfall

<sup>2</sup> Computed after removing variation due to sources of variability described in the ANOVA model

## **Annex**

### **Results of Statistical Analysis per Location**

Tables 1 1 - 1 3 Kurmin Biri (Nigeria)  
Tables 2 1 - 2 6 Kovie (Togo)  
Tables 3 1 - 3 6 Bouake (Ivory Coast)  
Tables 4 1 - 4 3 Avetonou (Togo)

LOCATION KURMIN BIRE (NIGERIA)

Table 1 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1\</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
26646	<i>Brachiaria brizantha</i>	1651	90	4	7137	23
606	<i>Brachiaria decumbens</i>	1090	93	4	4624	23
6780	<i>Brachiaria brizantha</i>	763	90	5	4920	16
621	<i>Andropogon gayanus</i>	737	85	3	5845	12
6133	<i>Brachiaria dictyoneura</i>	691	82	3	7972	10
6369	<i>Brachiaria humidicola</i>	607	95	4	4817	12
16031	<i>Panicum maximum</i>	477	90	9	1904	21
673	<i>Panicum maximum</i>	423	92	7	3594	13
Mean		805	90	5	5102	16
Min Max		0 2005	75 95	1 11	1166 9320	0 33
SD <sup>2\</sup>		271 2	5 2	2 6	1146 4	16
CV % <sup>2\</sup>		34	6	52	22	45
LSD Ecotype 5%		474	9	4	2004	13
Corr coeff with % cover at 12 weeks (establ )		0 07 ns	-		-0 19 ns	0 08 ns
Corr coeff with DM 12 weeks max rainfall		0 48 *	-0 19 ns	0 50 *	-	

<sup>1\</sup> Ordered by DM production during minimum rainfall

<sup>2\</sup> Computed after removing variation due to sources of variability described in the ANOVA model

## LOCATION KURMIN BIRE (NIGERIA)

Table 1 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
10136	<i>Stylosanthes guianensis</i>	1237	45	5	2866	43
184	<i>Stylosanthes guianensis</i>	1152	80	8	7570	15
5234	<i>Centrosema brasilianum</i>	1059	86	4	2701	41
5452	<i>Centrosema macrocarpum</i>	907	60	3	3784	26
5713	<i>Centrosema macrocarpum</i>	803	72	4	4316	18
5172	<i>Centrosema pubescens</i>	750	97	4	3284	27
5568	<i>Centrosema acutifolium</i>	440	65	3	3641	12
9690	<i>Aeschynomene histrix</i>	437	73	5	3573	12
1044	<i>Stylosanthes sympodiales</i>	383	83	2	4579	08
13089	<i>Desmodium ovalifolium</i>	360	55	5	3911	08
8279	<i>Zornia glabra</i>	310	70	3	2510	12
10280	<i>Stylosanthes capitata</i>	300	40	7	1355	20
147	<i>Stylosanthes hamata</i>	290	67	7	2313	12
728	<i>Zornia latifolia</i>	263	78	2	4403	06
5277	<i>Centrosema acutifolium</i>	230	52	4	2744	09
2	<i>Cassia rotundifolia</i>	217	94	6	4477	05
1281	<i>Stylosanthes macrocephala</i>	200	45	2	2388	07
13155	<i>Desmodium stngilosum</i>	167	20	10	4212	04
17434	<i>Arachis pinto</i>	130	48	4	1568	08
3	<i>Stylosanthes hamata</i>	130	87	3	5821	02
1	<i>Centrosema pascuorum</i>	113	98	4	6152	04
Mean		470	67	5	3722	14
Min Max		0-1781	15-100	1 2 13 3	0-9992	0 65
SD <sup>2)</sup>		224	11 6	1 6	1402	09
CV % <sup>2)</sup>		48	17 2	35	38	59
LSD Ecotype 5%		369	19	3	2314	24
Corr coeff with % cover at 12 weeks (establishment)		0 13 ns			0 39*	0 01 ns
Corr coeff with DM 12 weeks max rainfall		0 17 ns	0 39 **	0 09 ns		

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KURMIN BIRE (NIGERIA)

Table 1 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	OTHER INDICATORS					
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry rainy season ratio in terms of plant height
3001	<i>Codariocalix giroides</i>	1025	41	4694	21	116	44	38
18700	<i>Cajanus cajan</i>	897	110	3432	26	131	85	65
17403	<i>Flemingia macrophyla</i>	536	22	4617	12	113	36	33
17502	<i>Leucaena leucocephala</i>	220	31	2974	7	112	39	36
33138	<i>Desmodium velutinum</i>	120	15	5461	2	116	35	30
18516	<i>Cratylia argentea</i>	97	16	2265	8	100	38	40
Mean		483	39	3907	13	114	46	40
Min Max		40 1826	9 123	500 8309	1 34	65-157	28-89	27- 69
SD <sup>2)</sup>		311	8	1345	5 9	18	4 3	07
CV % <sup>2)</sup>		64 5	20 1	34 4	47	15 4	9 3	16
LSD Ecotype 5%		566	14	2442	11	32	8	12
Corr coeff with plant height 12 weeks (Establ )		0 58 *	-	-0 05 ns	0 73 **	0 33 ns	0 91 **	0 88 **
Corr coeff with DM 12 weeks max rainfall		0 29 ns	-0 05 ns			0 66 **	0 10 ns	-0 62 ns

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KOVIE (TOGO)

Table 2 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
606	<i>Brachiaria decumbens</i>	10356	63	-	12576	86
621	<i>Andropogon gayanus</i>	10068	83	-	16346	59
26646	<i>Brachiaria brizantha</i>	9435	70	-	9888	99
6780	<i>Brachiaria brizantha</i>	8812	82	-	8570	1 03
16031	<i>Panicum maximum</i>	8099	81	-	12571	65
673	<i>Panicum maximum</i>	7232	85	-	15111	48
6133	<i>Brachiaria dictyoneura</i>	6419	34	-	3905	1 16
6369	<i>Brachiaria humidicola</i>	3087	68	-	4197	75
Mean		7 938	71	-	10396	80
Min Max		2616 15622	16 98	-	0 23400	31 1 37
SD <sup>2)</sup>		2356	16	-	3164	19
CV % <sup>2)</sup>		30	23	-	30	24
LSD Ecotype 5%		4118	28	-	5531	34
Corr coeff with % cover at 12 weeks (establ )		0 05 ns			0 27 ns	-0 26 ns
Corr coeff with DM 12 weeks - max rainfall		0 65 **	0 27 ns		-	

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

## LOCATION KOVIE (TOGO)

Table 2 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
10136	<i>Stylosanthes guianensis</i>	9366	12		4979	1.9
9690	<i>Aeschynomene histrix</i>	5672	51		6682	86
5713	<i>Centrosema macrocarpum</i>	5112	59		3534	15
5452	<i>Centrosema macrocarpum</i>	4926	71		3528	14
5234	<i>Centrosema brasilianum</i>	4854	86		3638	14
5172	<i>Centrosema pubescens</i>	4758	85		3854	13
5568	<i>Centrosema acutifolium</i>	4294	61		3680	11
13155	<i>Desmodium strigiliosum</i>	4174	5		577	3.9
5277	<i>Centrosema acutifolium</i>	3903	42		2800	14
147	<i>Stylosanthes hamata</i>	3794	44		7050	55
728	<i>Zornia latifolia</i>	3417	14		0	
3	<i>Stylosanthes hamata</i>	3116	80		5173	69
13089	<i>Desmodium ovalifolium</i>	2321	24		2415	99
8279	<i>Zornia glabra</i>	2211	58		3406	45
2	<i>Cassia rotundifolia</i>	1568	85		2175	72
17434	<i>Arachis pintoi</i>	1171	41		586	53
1	<i>Centrosema pascuorum</i>	0	99		4790	0
10280	<i>Stylosanthes capitata</i>	0	15		3876	0
1044	<i>Stylosanthes sympodiales</i>	0	6		3310	0
1281	<i>Stylosanthes macrocephala</i>	0	9		734	0
184	<i>Stylosanthes guianensis</i>	0			0	
Mean		3079	50		3189	94
Min Max		0-11160	3-100		0-7712	0-3.9
SD <sup>2)</sup>		1315	17		1191	24
CV % <sup>2)</sup>		43	34		37	25
LSD Ecotype 5%		2171	30		1965	46
Corr coeff with % cover at 12 weeks (Establishment)		-0.06 ns			0.24 ns	-0.00 ns
Corr coeff with DM 12 weeks max rainfall		0.38 **		0.24 ns		

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model



LOCATION KOVIE (TOGO)

Table 2 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	OTHER INDICATORS					
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry rainy season ratio in terms of plant height
17403	<i>Flemingia macrophylla</i>	6211	30	3174	193	74	71	97
18700	<i>Cajanus cajan</i>	5066	127	4529	110	148	106	71
17502	<i>Leucaena leucocephala</i>	4709	100	5209	91	227	166	72
18516	<i>Cratylia argentea</i>	-	-	0	-	-	-	-
3001	<i>Codariocalix giroides</i>	-	-	0	-	-	-	-
33138	<i>Desmodium velutinum</i>	-	-	0	-	-	-	-
Mean		5329	86	2039	131	140	114	81
Min Max		2669 8448	13-144	0-6033	50 212	67 234	65-174	66 1 1
SD <sup>2)</sup>		205	20	651	17	10	9	07
CV % <sup>2)</sup>		4	23	32	13	7	8	9
LSD Ecotype 5%		467	45	1144	39	28	20	21
Corr coeff with plant height 12 weeks (Estab)		0 13 ns	-	0 63 ns	-0 52 ns	0 60 ns	0 55 ns	-0 55 ns
Corr coeff with DM 12 weeks max rainfall		0 28 ns	0 63 ns			0 78 *	0 77 *	-0 30 ns

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION KOVIE (TOGO)

Table 2 4 Second Biomass production evaluation GRASSES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
26646	<i>B brizantha</i>	4971
621	<i>A gayanus</i>	4946
16031	<i>P maximum</i>	3949
606	<i>B decuambens</i>	3650
673	<i>P maximum</i>	3592
6369	<i>B humidicola</i>	3580
6133	<i>B dictyoneura</i>	3016
6780	<i>B brizantha</i>	2356
Mean		3758
Min Max		1645-6765
SD <sup>1)</sup>		938
CV % <sup>1)</sup>		25
LSD Ecotype 5%		1639

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

## LOCATION KOVIE (TOGO)

Table 2 5 Second Biomass production evaluation HERBACEOUS LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
3	<i>S hamata</i>	5790
147	<i>S hamata</i>	4659
8279	<i>C glabra</i>	3769
5713	<i>C macrocarpum</i>	3256
5568	<i>C acutifolium</i>	3162
5172	<i>C pubescens</i>	2782
17434	<i>A pinto</i>	2707
5452	<i>C macrocarpum</i>	2616
1	<i>C pascuorum</i>	2611
13155	<i>D strigillosum</i>	2281
728	<i>Z latifolia</i>	2085
13089	<i>D ovalifolium</i>	2045
9690	<i>A hystrix</i>	2041
1281	<i>S macrocephala</i>	1685
10136	<i>S guianensis</i>	1636
10918	<i>S scabra</i>	1594
5277	<i>C acutifolium</i>	1577
5234	<i>C brasilianum</i>	1276
10280	<i>S capitata</i>	844
Mean		2569
Min Max		650 7238
SD <sup>1)</sup>		967
CV % <sup>1)</sup>		38
LSD Ecotype 5%		1669

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION KOVIE (TOGO)

Table 2 6 Second Biomass production evaluation TREE LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
17403	<i>F macrophylla</i>	4307
18700	<i>C cajan</i>	4186
17502	<i>L leucocephala</i>	3481
Mean		3991
Min Max		2388 5404
SD <sup>1)</sup>		597
CV % <sup>1)</sup>		15
LSD Ecotype 5%		1357

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION BOUAKE (IVORY COAST)

Table 3 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
6133	<i>Brachiaria humidicola</i>	4666	47	4	9106	49
26646	<i>Brachiaria brizantha</i>	3537	19	11	14815	25
673	<i>Panicum maximum</i>	3386	31	10	14176	24
621	<i>Andropogon gayanus</i>	2748	82	1	20270	14
606	<i>Brachiaria decumbens</i>	2283	48	7	15059	17
6369	<i>Brachiaria humidicola</i>	1903	30	7	6389	31
6780	<i>Brachiaria brizantha</i>	1610	33	13	12177	13
16031	<i>Panicum maximum</i>	1140	97	6	8946	14
Mean		2659	48	7	12617	23
Min Max		1070-6635	3 100	1-33	5193 22483	07 70
SD <sup>2)</sup>		1249	31	10	3894	10
CV % <sup>2)</sup>		47	67	137	31	44
LSD Ecotype 5%		2183	56	18	6806	18
Corr coeff with % cover at 12 weeks (establ )		-0 34 ns			-0 07 ns	-0 31 ns
Corr coeff with DM 12 weeks max rainfall		0 27 ns	-0 07 ns	0 13 ns	-	

<sup>1)</sup> Ordered by DM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

## LOCATION BOUAKÉ (IVORY COAST)

Table 3 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1\</sup>	Most important indicator	Other indicators			
		DM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks
10136	<i>Stylosanthes guianensis</i>	4250	59	2	8423	53
164	<i>Stylosanthes guianensis</i>	2367	97	1	11207	22
5713	<i>Centrosema macrocarpum</i>	2174	89	1	5192	45
5452	<i>Centrosema macrocarpum</i>	2070	93	1	4892	44
5234	<i>Centrosema brasilianum</i>	1760	100	1	2092	84
5172	<i>Centrosema pubescens</i>	1628	100	1	4493	37
5568	<i>Centrosema acutifolium</i>	1370	93	1	4837	28
5277	<i>Centrosema acutifolium</i>	1097	93	1	3764	31
9690	<i>Aeschynomene histrix</i>	1020	95	1	8004	13
8279	<i>Zornia glabra</i>	727			3520	21
2	<i>Cassia rotundifolia</i>	570			2531	23
147	<i>Stylosanthes capitata</i>	357	93	1	8679	05
3	<i>Stylosanthes hamata</i>				7995	
10280	<i>Stylosanthes capitata</i>		80	1	5550	
1	<i>Centrosema pascuorum</i>				5015	
17434	<i>Arachis pintoi</i>		90	1	3226	
1281	<i>Stylosanthes macrocephala</i>		65	2	3093	
13089	<i>Desmodium ovalifolium</i>		33	3		
1044	<i>Stylosanthes sympodiales</i>		30	4		
13155	<i>Desmodium strigillosum</i>		6	10		08
Mean		1616	77	1.7	5418	34
Min Max		350-9336	1-100	1-10	1886-13834	03-1.2
SD <sup>2\</sup>		1281	14	1	1595	19
CV % <sup>2\</sup>		79	18	38	29	57
LSD Ecotype 5%		2166	24	1.2	2604	33
Corr coeff with % cover at 12 weeks (Establishment)		-0.72 **			0.05 ns	-0.39 *
Corr coeff with DM 12 weeks max rainfall		0.17 ns	0.05 ns	0.004 ns		

Ordered by DM production during minimum rainfall

<sup>2\</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION BOUAKE (IVORY COAST)

Table 3 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1\</sup>	Most important indicator	OTHER INDICATORS					
		DM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	DM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of DM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry rainy season ratio in terms of plant height
18516	<i>Cratylia argentea</i>	1183	-	653	2 0	-	-	-
18700	<i>Cajanus cajan</i>	1173	-	2046	57	-	-	-
17502	<i>Leucaena leucocephala</i>	1167	-	4384	35	-	-	-
3001	<i>Codariocalix giroides</i>	577	-	4900	11	-	-	-
17403	<i>Flemingia macrophylla</i>	560	-	2428	25	-	-	-
33138	<i>Desmodium velutinum</i>	393	-	780	59	-	-	-
Mean		842	-	2532	64	-	-	-
Min Max		270-1410	-	420-7341	09 2 5	-	-	-
SD <sup>2\</sup>		266	-	1328	31	-	-	-
CV % <sup>2\</sup>		32	-	52	49	-	-	-
LSD Ecotype 5%		484	-	2411	57	-	-	-
Corr coeff with DM 12 weeks max rainfall		0 01 ns	-	-	-	-	-	-

<sup>1\</sup> Ordered by DM production during minimum rainfall

<sup>2\</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION BOUAKE (IVORY COAST)

Table 3 4 Second Biomass production evaluation GRASSES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
673	<i>P maximum</i>	4430
6780	<i>B brizantha</i>	4043
606	<i>B decumbens</i>	3740
26646	<i>B brizantha</i>	3710
6369	<i>B humidicola</i>	3513
6133	<i>B dictyoneura</i>	3470
621	<i>A gayanus</i>	3107
16031	<i>P maximum</i>	2840
Mean		3607
Min Max		1950 5610
SD <sup>1)</sup>		1108
CV % <sup>1)</sup>		31
LSD Ecotype 5%		1937

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model



LOCATION BOUAKE (IVORY COAST)

Table 3 5 Second Biomass production evaluation HERBACEOUS LEGUMES

CIAT No	NAME	DM-12 weeks during max rainfall (kg/ha)
184	<i>S guianensis</i>	4997
3	<i>S hamata</i>	4833
5713	<i>C macrocarpum</i>	4377
5452	<i>C macrocarpum</i>	3730
5172	<i>C pubescens</i>	3043
5568	<i>C acutifolium</i>	2623
8279	<i>Z glabra</i>	2263
2	<i>C rotundifolia</i>	2247
13089	<i>D ovalifolium</i>	2047
10280	<i>S capitata</i>	2010
147	<i>S hamata</i>	1990
17434	<i>A pinto</i>	1747
5277	<i>C acutifolium</i>	1450
Mean		2866
Min Max		1110-6150
SD <sup>1)</sup>		634
CV % <sup>1)</sup>		22
LSD Ecotype 5%		1068

<sup>1)</sup> Computed after removing variation due to sources of variability in the ANOVA Model

LOCATION AVETONOU (TOGO)

Table 4 1 Establishment and biomass production indicators GRASSES

CIAT No	Name <sup>1)</sup>	Most important indicator	Other indicators			
		GM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	GM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of GM 12 weeks
26646	<i>Brachiaria brizantha</i>	11333	75	51	16267	67
606	<i>Brachiaria decumbens</i>	11067	70	46	14200	83
6133	<i>Brachiaria dictyoneura</i>	5500	70	52	9200	71
6780	<i>Brachiaria brizantha</i>	5200	66	44	11400	51
6369	<i>Brachiaria humidicola</i>	4500	67	49	6800	70
621	<i>Andropogon gayanus</i>	4000	74	37	11067	37
673	<i>Panicum maximum</i>	3900	58	72	17133	28
16031	<i>Panicum maximum</i>	3400	63	57	13533	33
Mean		6139	68	51	12591	54
Min Max		1900-18500	40 84	18 103	5000 28600	13 1 2
SD <sup>2)</sup>		3159	8	17	7093	24
CV % <sup>2)</sup>		51	12	34	56	45
LSD Ecotype 5%		5733	14	31	12873	44
Corr coeff with % cover at 12 weeks (Establ)		0 11 ns			-0 22 ns	0 11 ns
Corr coeff with DM 12 weeks max rainfall		0 39 ns	-0 22 ns	-0 07 ns		-

<sup>1)</sup> Ordered by GM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model

Table 4 2 Establishment and biomass production indicators HERBACEOUS LEGUMES

CIAT No	Name <sup>1\</sup>	Most important indicator	Other indicators			
		GM 12 weeks during min rainfall (kg/ha)	Establishment		Production	
			% cover at 12 weeks (%)	Cover at 4 weeks as a % of total cover (%)	GM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of GM 12 weeks
5713	<i>Centrosema macrocarpum</i>	10067	79	12	6933	1 5
5452	<i>Centrosema macrocarpum</i>	8533	65	17	7600	1 1
184	<i>Stylosanthes guianensis</i>	8500	63	15	15267	57
5172	<i>Centrosema pubescens</i>	8233	92	29	8533	1 1
5568	<i>Centrosema acutifolium</i>	7833	91	21	7133	1 2
8279	<i>Zornia glabra</i>	7033	61	16	6333	1 2
5277	<i>Centrosema acutifolium</i>	6000	70	11	5467	1 2
5234	<i>Centrosema brasilianum</i>	5833	92	31	6533	84
10136	<i>Stylosanthes guianensis</i>	5700	51	10	11533	61
3	<i>Stylosanthes hamata</i>	5167	63	19	8933	59
147	<i>Stylosanthes hamata</i>	3833	55	22	11533	35
1044	<i>Stylosanthes sympodiales</i>	3800	34	16	6900	40
9690	<i>Aeschynomene histrix</i>	2983	63	28	11733	30
13155	<i>Desmodium strigiliosum</i>	2667	62	10	5733	44
2	<i>Cassia rotundifolia</i>	2533	82	23	2467	1 2
17434	<i>Arachios pintor</i>	2000	58	11	2733	43
13089	<i>Desmodium ovalifolium</i>	1600	78	9	3400	32
728	<i>Zornia latifolia</i>		66	5	2300	
10280	<i>Stylosanthes capitata</i>		50	11	1067	
1281	<i>Stylosanthes macrocephala</i>		51	9	800	
1	<i>Centrosema pascuorum</i>		73	7		
Mean		5817	67	16	6821	83
Min Max		1000 11700	18-98	4 58	200-18400	18 2 1
SD <sup>2\</sup>		1984	9	7	2173	28
CV % <sup>2\</sup>		34	14	46	32	34
LSD Ecotype 5%		4051	15	12	3734	57
Corr coeff with % cover at 12 weeks (Establishment)		0 17 ns			-0 003 ns	0 30 *
Corr coeff with DM 12 weeks max rainfall		0 22 ns	-0 063 ns	0 17 ns		

<sup>1\</sup> Ordered by GM production during minimum rainfall

<sup>2\</sup> Computed after removing variation due to sources of variability described in the ANOVA model

LOCATION AVETONOU (TOGO)

Table 4 3 Establishment and biomass production indicators TREE LEGUMES

CIAT No	Name <sup>1)</sup>	Most important indicator	OTHER INDICATORS					
		GM 12 weeks during min rainfall (kg/ha)	Establishment	Production				
			Plant height at 12 weeks (cm)	GM 12 weeks during max rainfall (kg/ha)	Dry rainy season ratio in terms of GM 12 weeks	Plant height at 12 weeks max rainfall (cms)	Plant height at 12 weeks min rainfall (cms)	Dry rainy season ratio in terms of plant height
17502	<i>Leucaena leucocephala</i>	12667	34	2933	15.3	96	154	1.7
18700	<i>Cajanus cajan</i>	11900	168	6133	1.8	132	155	1.1
17403	<i>Flemingia microphylla</i>	10867	540	5600	2.0	103	97	93
3001	<i>Codariocalix giroides</i>	7500	40	7800	92	101	63	76
18516	<i>Cratylia argentea</i>	-	10	-	-	-	-	-
Mean		10940	67	5418	6.3	108	119	1.2
Min Max		5600-22000	10-188	200-9200	40-0	50-153	61-192	2-3
SD <sup>2)</sup>		6310	15	2687	13.7	27	23	38
CV % <sup>2)</sup>		58	23	50	216	25	19	31
LSD Ecotype 5%		16022	34	5988	45.3	59	58	1.3
Corr coeff with plant height 12 weeks (Estab)		0.16 ns	-	0.40 ns	-0.36 ns	0.67 *	0.42 ns	-
Corr coeff with DM 12 weeks max rainfall		0.52 ns	0.40 ns			0.64 *	0.10 ns	-0.62 ns

<sup>1)</sup> Ordered by GM production during minimum rainfall

<sup>2)</sup> Computed after removing variation due to sources of variability described in the ANOVA model